



# CP2 CENTER NEWS

Newsletter of the California Pavement Preservation Center

No. 42

June 2017

## Big Transportation Bill Will Demand Results - Quickly!

By Russell Snyder, California Asphalt Pavement Association (CalAPA)

As expected, in April Gov. Jerry Brown signed into law SB1 and related legislation that were part of the biggest transportation funding overhaul in state history, intended to reverse years of neglect to state and local roadways and other infrastructure.



The measures are expected to generate an estimated \$52 billion over 10 years through a variety of tax and fee increases, including a 12-cent per gallon hike in pump prices. In all, the various tax and fee increases are expected to cost the average motorist about \$10 more per month.

For an industry battered by years of recession, there's no doubt the expected tide of funds to be generated by SB1 will be welcome news to materials producers, paving contractors and others connected to the industry. Public agencies also will welcome the influx of funds to address a huge backlog of road repairs.

As with anything, one problem (not enough money to fix crumbling roads) will soon be replaced with another: Getting needed funds converted to pavement repairs as quickly as possible. This will create enormous pressure on



public works agencies to get the money on the street quickly in a way that will be noticeable by motorists.

Those same motorists will be driving to the polls in November of 2018, and any member of the Legislature who voted to increase their taxes

will need to show that the money is being spent prudently. Already the drumbeat of anti-tax forces is echoing around the state, and at least one recall election has been initiated against a member of the Assembly from a swing district in Southern California who voted for SB1. Expect to see more negative campaign ads next year.

Gearing up for all that road work will take time. For example, collecting the additional funds from the increase in fuel taxes will not begin until Nov. 1, which means any increase in roadwork will not begin until well into 2018.

Pavement projects are the fastest and easiest to deliver, so they should benefit from the first increases in funding. Further, they will also be the most conspicuous to the motorists who are paying for the work, rather than off-highway programs that also will be funded by SB1, such as transit, culvert repairs, research and other elements of the compromise bill.

*Continued, next page*

### IN THIS ISSUE

#### 1 Big Transportation Funding Overhaul

#### ASPHALT PAVEMENT NEWS

#### 2 CalAPA Spring Conference in Ontario

#### 4 WRAPP Update-Section 37 Workshops

#### 4 Rubber Specification for Local Agencies

#### 5 Greenbook Specifications Update

#### 5 AAPT Update

#### 6 Fabric Interlayers-High Temp Guidelines

#### 8 Sacramento Approach to Potholes

#### 9 Wide Crack Treatment & Patching

#### PCC PAVEMENT NEWS

#### 10 IGGA Update-DBR on Thin PCC Overlays

#### GENERAL NEWS

#### 11 P2 Certification Program

#### 11 MTC Update-Accountability & Performance Tracking

#### 13 FHWA Update

#### 14 Emulsion Task Force Update-AASHTO

#### 14 Pavement Maintenance & Reconstruction Magazine

#### 15 COMING EVENTS

Pivoting quickly to 'road-repair' mode will also pose challenges for industry, and the term "industry capacity" will no doubt return to vogue, as it did during the Proposition 1B infrastructure bond era of the Schwarzenegger administration, and the 2009 Obama-era economic stimulus known as the American Reinvestment & Recovery Act, or ARRA.

Unlike previous road-building booms, however, the construction industry is much smaller than it used to be, and workers who left the industry during the Great Recession are unlikely to return. This will place fresh pressure on the industry to recruit and train the next generation of workers and ensure that they work safely and efficiently in delivering the road construction and maintenance projects.

Similarly, public agencies will need to design and advertise projects quickly, and ensure that they are constructed properly, which will create its own recruitment and training challenges.

Caltrans, for one, has lamented the "Silver Tsunami" of senior workers who are poised to retire. Caltrans State Pavement Engineer Jesse Bhullar told a meeting of the joint Caltrans-industry Rock Products Committee last month that 20 percent of the civil servants in the pavement program could retire in the next two years, and up to half could be gone in five years.

The Democratic governor will be retiring next year and won't face voters over the big transportation bill. But scores of state Senators and members of the Assembly will, and they will be in no mood for excuses about bureaucratic hurdles or workforce challenges to fixing roads. They will want to show success, early and often, to demonstrate to their constituents that they chose action over gridlock, and that it is returning showing tangible results. Their jobs, literally, will be on the line.



And then there's Washington, D.C. A new president has made bold pronouncements about infrastructure investment, but so far Congress has produced nothing tangible. Desperate for a legislative win, could a big infrastructure bill be the bipartisan ticket out of the doldrums? California has clearly thrown down the gauntlet to Washington as if to say, "If we can do it, why can't you?"

Senate President Pro Tem Kevin De León minced no words with his statement Friday after the governor signed SB1: "While Washington can barely get its act together, in California we stepped up to address one of the most pressing concerns facing our residents. This plan is fiscally responsible and will improve the quality of life for all Californians while creating jobs. Our roads will be safer and our cities and towns will be better connected to each other - finally bringing our transportation infrastructure into the 21st century."

Are you listening, Washington? 2017 is shaping up to be the year of transportation. Hold on. It's going to be a bumpy ride!

A good overview video discussion of SB1 has been prepared by the California State Association of Counties (CSAC) and is available at: <https://www.youtube.com/watch?v=tHSEqB-roSc> Information on this and other timely topics can be found on the CalAPA website at: [calapa.net](http://calapa.net)



## CalAPA Spring Conference Highlights

By Roger Smith, CP<sup>2</sup> Center

For the latest developments in the world of asphalt pavement technology people have learned to depend on the California Asphalt Pavement Association (CalAPA). Their semi-annual Conferences have become important educational events.

The 160 Attendees at the Spring Conference and Equipment Show, held April 12-13 in Ontario, weren't disappointed. As part of the conference, the popular half-day "Asphalt Pavement

101" class was also offered. Here are some highlights from the Conference.

CalAPA Executive Director, Russell Snyder, welcomed the group and introduced the keynote speaker Roger Dickenson of transportation California, an advocacy group for transportation funding. He outlined the funding proposal (now in place as SB1) and stressed the need for agencies to show benefits and that the controversial funding is being put to good use.

*Continued, next page*

ASPHALT  
PAVEMENT  
NEWS

As funds are made available agencies may need to staff-up to turn out projects. So more education and training of personnel may be needed.

As topics got more technical, the hot topic of porous asphalt was addressed by Amir



Ghavibazoo of Twining, Inc. He stressed that porous pavement technology minimizes surface runoff, and is best suited for very low volume roads and parking lots, where native soils are somewhat permeable and not compacted. A thick reservoir layer of coarse rock is also required under the porous asphalt surface. Regular

vacuum cleaning of the surface is important to maintain its functionality.

The challenges of local transportation authorities were discussed by Paula Beauchamp of the San Bernardino County Transportation Authority (SBCTA). These local groups use local funding (e.g. local sales tax dollars) for transportation projects - often partnering with Caltrans for enhancements to existing Caltrans facilities...for example, lane additions on I-10, or the extension of the I-210 freeway.

Updating of the "Greenbook" specifications was outlined by Erik Updike of Los Angeles County DPW. These updates occur every 3 years, and are addressing issues such as % RAP, ground tire additives, polymer-modified emulsions, cold milling of pavement, tack coats and the Superpave mix design method. (See a more detailed article elsewhere in this newsletter.)

Caltrans specifications and issues were discussed by Sri Balasubramanian of Caltrans and Jack VanKirk of George Reed Inc. / Basic Resources. Caltrans and Industry reps work together on specifications via the Rock Products Committee (RPC). The RPC has an Asphalt Task Group and numerous Sub-Task Groups to address topics like RAP/RAS, rubber tire additives, intelligent compaction technology, Section 39, and sampling / testing issues.

The general goal of the RPC is to have good specifications that are performance related and applied consistently statewide by all 12 Caltrans Districts.



**Shadi Saadeh and Tim Greutert Discuss the JTCP**

Caltrans is developing a program to develop a 'joint' (for both Caltrans and industry people) training and certification program (JTCP) for fields testers. Tim Greutert of Caltrans and Shadi Saadeh of CSU, Long Beach, presented an update on this effort. The program will provide online 'prerequisite' training, classroom and lab training, and finally, testing – both a written exam and hands-on practical evaluation. The training modules and handbooks have been developed and reviewed, and the first training is slated for early 2018. One can visit CSU Long Beach JTCP website for more information at:

<http://web.csulb.edu/colleges/coe/jtcp/>

Another highlight of the Conference is interacting with equipment vendors and seeing equipment close up. An array of indoor vendor exhibits and the outdoor display of construction equipment drew a lot of interest from the attendees.



**Kyle Kubik of Tulare County at the Equipment Display**

Mark your calendars for the Fall 2018 Conference, October 25-26, in Sacramento. The popular "Asphalt Pavement 101" training class will again be offered.

For more information visit the CalAPA website at: [www.calapa.net](http://www.calapa.net)





## WRAPP Update

By Sallie Houston, VSS International



The Western Regional Association for Pavement Preservation (WRAPP) recently partnered with Caltrans to offer free workshops to provide an overview of changes to Section-37 (Seal Coats) of the 2015 Standard Specifications, and training on best construction and inspection practices for seal coats. The workshop was designed to benefit Caltrans, local agency, and industry personnel. Two seminars were held in May - at the District 6 office in Fresno and District 11 office in San Diego. There were approximately 75 attendees at both events.

A presentation by Sri Holikatti from Caltrans' Office of Asphalt Pavement focused on the "nested pyramid, plain language" format of the 2015 Standard Specifications. Industry members of WRAPP presented on the different sections within Section 37, including slurry seal, micro surfacing, emulsion chip seal and hot applied chip seal.

These presentations covered, material testing and application, calibration and inspection. There was also a slurry seal mix table demonstrating how these products look and act, as well as samples and discussion on crack fill products.

These workshops rounded out an effort to reach several regions in the state. Workshops had been held in Redding and Fontana in 2016. All events were well attended, with active open discussion on these topics.

WRAPP president Sallie Houston noted "It is a win-win situation when industry and agency can partner in this manner, and we will look for future opportunities to team up with Caltrans."

For more information visit the WRAPP website at: [www.wrapp.org](http://www.wrapp.org)

Or contact Sallie Houston with VSS International at: [sallie.houston@slurry.com](mailto:sallie.houston@slurry.com)



## Rubber Specifications For Local Agencies

By Theron Roschen, P.E., Interwest Consulting Group

On behalf of the California Department of Resources, Recycling and Recovery (CalRecycle), NCE and Interwest Consulting Group have developed specification templates for pavement products containing crumb-rubber. These specifications include hot-applied chip seals and hot mix asphalt (HMA) using asphalt rubber or rubber-modified asphalt (a.k.a. "terminal blend").

The specifications are intended for use by California local agencies (e.g., cities and counties) and utilize materials and construction practices that are available in the California market. They also are intended to address elements of the Caltrans specifications not appropriate for use by local agencies, especially with regards to quality control and acceptance testing requirements, but also with regards to the simplicity and organization of the specification. The specifications may be used in conjunction with the CalRecycle grant program.

Private industry contractors, crumb rubber pro-

ducers and the California Pavement Preservation Center at CSU Chico have all reviewed these specifications and their comments have been incorporated into them. Specific features include:

- Inclusion of both asphalt-rubber and rubber-modified binder products
- Chip seals
- Gap-graded and dense-graded hot-mix
- Optional sections with advice for the specifiers in selecting options
- Both Hveem and Superpave mix design guidelines
- Can be used in conjunction with either Caltrans or Greenbook specifications.

The external Webpage Link is: [http://192.186.205.27/calrecycle/rubber\\_specs.html](http://192.186.205.27/calrecycle/rubber_specs.html)

For more information contact: Theron Roschen, P.E., Municipal Services Manager Interwest Consulting Group, (916)303-2780 [troschen@interwestgrp.com](mailto:troschen@interwestgrp.com)



## Greenbook Specifications Update

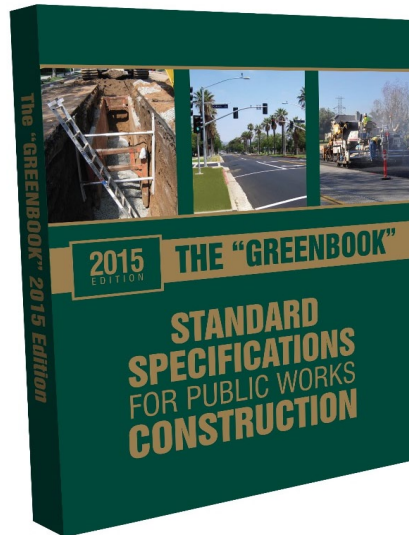
By Erik Updyke, P.E., Los Angeles County Department of Public Works, APWA Co-Chair

A new edition of the "Greenbook" ("Standard Specifications for Public Works Construction") is published every three years. The next edition will be in 2018 and the publication deadlines are fast approaching. Several changes related to pavement preservation will be included. In addition, the Asphalt Task Force and Surface Materials and Methods Subcommittee are currently discussing changes to be incorporated into future supplements or editions.

The Greenbook has long lacked a specification for polymer modified emulsion. The 2018 edition will include one as part of a revision and update to the current emulsion specifications. Microsurfacing is becoming increasingly common in Southern California, as is micro-milling. New subsections will be included for both. The addition of micro-milling is part of a change to update the current cold milling specifications and place them in Part 4, "Existing Improvements." The intent of Part 4 is to consolidate into one part all work related to existing improvements, somewhat like Section 15 of the Caltrans Standard Specifications.

Changes published in supplements are incorporated into the next edition. The 2018 edition will include the changes published in the 2016 Supplement. A 2017 Supplement was not printed. The 2016 Supplement included a complete revision of the specifications for tire

rubber modified asphalt concrete (TRMAC) and the addition of specifications for polymer modified asphalt concrete. MAC-10TR was removed from the TRMAC specifications and PG 64-28TR and PG 76-22TR were added.



The Asphalt Task Force has been discussing a Superpave specification suitable for local agency roads for the past several months. The approach discussed and agreed to was to perform gyratory compaction testing on a proven, well performing Hveem mix at a specific number of gyrations (65), calculate the air voids, and back-calculate the number of gyrations required to result in a mix with 4 percent air voids. The first round of testing on a C2 (1/2" max.) gradation mix is underway with 10 to 12 labora-

tories participating. Once the testing is completed, the results will be compared and the number of gyrations established following by another round of testing.

The Asphalt Task Force has also begun discussion of a major revision and update of the specifications for placement of asphalt concrete pavement, which are in subsection 302-5.

All Greenbook Committee, Subcommittee, and Task Force meetings are available via Go To Meeting. A calendar of upcoming meetings, meeting minutes, and agendas for upcoming meetings are available on the Greenbook web site, [www.greenbookspecs.org](http://www.greenbookspecs.org). Anyone interested in attending and participating is welcome.



## AAPT Meeting held in Newport Beach

By R. Gary Hicks, CP<sup>2</sup> Center

Over 250 people attended the 2017 annual meeting of the Association of Asphalt Pavement Technologists (AAPT) in Newport Beach, CA, from March 19-22 - including 30 people from California, representing academia, industry, and agencies. AAPT has long been considered one of the leading asphalt research and technology groups in the United States. The technical sessions consisted of the following:

1. A "Leading Edge Workshop" on practical implementation of asphalt mix performance



tests. This session discussed the implementation of products including performance specs for asphalt mixes, including cracking tests such as the semi-circular bending (SCB) and Illinois I-Fit test, and other performance tests.

2. Technical Session 1 on pavement preservation included presentations on the use of reflection cracking relief interlayers, cold recycled foamed mixes and cracking tests for cold in-place recycling. *Continued, next page*

3. Technical Session 2 on asphalt mix testing included presentations on asphalt content determination using the ignition oven test, and the evaluation of the Hamburg wheel tracking (HWT) testing devices and specifications.



**Figure 1. Gary Hicks Discussing the History of Rubberized Asphalt**

4. An international forum on hot in-place (HIR) recycling addressed state-of-the-art and new challenges. Presentations in this session were from Switzerland, Japan, Costa Rica, Taiwan, and France on the current practices and challenges with HIR processes.
5. Technical Session 3 on asphalt binders included the simulation and validation of the asphalt foaming process for warm mix asphalt, effect of asphalt ageing on asphalt binders, reversible ageing in binders, comparison of asphalt binder and mix cracking, and low temperature properties of asphalt binders.
6. Technical Session 4 on asphalt mixtures included a "Symposium on Rubberized Asphalt Use: History, Developments, Opportunities, and Challenges". A presentation discussed methods of improving the cohesion of porous friction courses, while the Symposium included presentations on :
  - a. The history of rubberized asphalt - its use and the benefits.
  - b. New technologies in the Midwest

- c. Performance characteristics of the rubberized asphalt mixtures.
- d. Lessons learned from Caltrans, the largest user agency.
- e. Environmental benefits of rubberized asphalt.
- f. Production of rubber binders, both terminal and field blends.
- g. An FHWA study dealing with Guidance for rubberized asphalt use.

7. Technical session 5 on recycling included 5 presentations dealing with the properties of various asphalt binders from recycled mixes, including the effectiveness of recycling agents with high RAP and RAS contents, performance of warm mix asphalts (WMA) with RAP and RAS, and crack development rates in high-percentage RAP mixes.
8. Technical session 6 on cracking and new tests included presentations on assessing cracking in asphalt mixes using a variety of test devices including an overlay tester, fatigue tests, direct tension tests and more.

Information on AAPT can be found on their website at: <http://www.asphalttechnology.org/> All of the 2017 papers will be published in the annual journal of the organization. AAPT members can gain access to the papers and presentations now through the website.

For more information contact: Gary Hicks at: [rg Hicks40@outlook.com](mailto:rg Hicks40@outlook.com)



**Figure 2. Kee Foo of Caltrans Discussing the Caltrans Experience of Rubberized Asphalt**

## Interlayer Installation At High Ambient Temperatures

By Ray Myers, AIA

The benefits of interlayers are documented going back over 40 years. Interlayers delay reflective cracking and form a moisture barrier when properly installed using hot PG asphalt tack coat. A dry aggregate base maintains its load bearing capacity. Interlayer manufacturers have continually added new and improved interlayers (e.g., paving mats, grids and

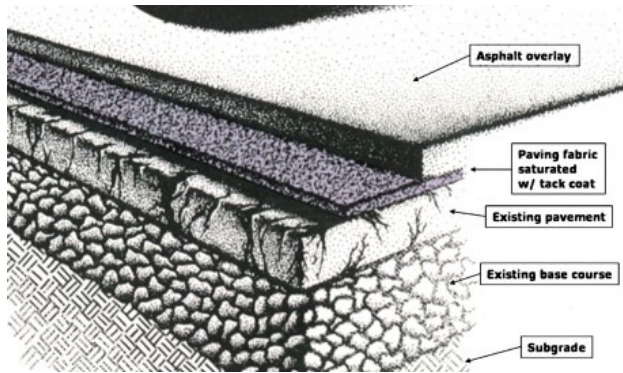
composite grids) to provide reinforcement of hot and warm mix asphalts.

But challenges can occur from the asphalt tack coat bleeding through the interlayer when pavement temperatures exceed about 90F during installation. This advisory provides options to address that bleeding problem and

*Continued, next page*



resulting vehicle tire pickup prior to or during the installation of the asphalt mix overlay.



Typical Cross Section View

For tack coats, polymerized and neat (unmodified) hot asphalt binders are always recommended - as opposed to emulsions. High viscosity binders are always preferred. If the project is to be installed where project site temperatures will be elevated, harder (more viscous) binders are very important. If available, a PG 70 grade binder, and/or trackless tack binders, will result in improved constructability. Manufacturer's recommendations should always be followed as to the quantity of asphalt binder tack coat applied for the specific interlayer. Full saturation of the interlayer is imperative.

The installation of the chosen interlayer can be accomplished with a distributor truck fitted with a laydown unit attached. This holds the

material roll and embeds the interlayer within very close proximity of the spreading of the hot asphalt tack coat. As an alternate, a small tractor unit with the laydown apparatus is also common and very acceptable. The latter unit provides some



Interlayer laydown

flexibility in that on very hot days the hot tack coat can be allowed to minimally cool before the interlayer is rolled out and embedded. This is not recommended when the interlayer is being placed under a chip seal.

To minimize bleeding and tracking, public traffic directly on the placed interlayer should be avoided whenever possible, and construction traffic should be as limited as possible. For safety reasons, vehicle speeds should be controlled to less than 25mph. Sharp turning, hard stops and starts should be avoided.

Common practices used for many years to mitigate the problems from hot weather bleeding of tack coat are; spraying water, broadcasting asphalt mix or spreading sand over the interlayer. Each practice is discussed below;

Water spray requires just the right amount - and at the right time. Too much leaves unwanted moisture impacting bonding of the overlay. Too little or too early will result in total evaporation and no benefit.

Spreading of asphalt mix has shortcomings in that placing it uniformly is difficult. Excessive piles result in cold, uncompacted mix that degrades the overlay, both in uniformity as well as ultimate compaction. Also, pick up of the loose mix by traversing vehicles (construction and public) can track the loose material outside of the project limits creating additional cleanup as well as potential flying material damage to other vehicles.

Sanding is a very good option. It has been reported from the field that sand works best when using fiberglass mat interlayers. Pavement temperatures above 90F will soften tack coat binders and the fiberglass products are more prone to



slippage. Sand should be broadcast evenly onto the mat at a rate of 1-2 lb/sy. Even if placement is uneven and piles occur, they will be eliminated when sweeping [vacuum or pickup] or blowers [in rural areas] are utilized to remove the excess. The sand will be an effective bond breaker and thus reduce slippage and pick-up by vehicle tires. This is especially true on old pavements that have been sealcoated or when installing on a diamond-ground surface. Excess sand must be removed prior to the installation of the overlay by using vacuum pickup, sweeping (no metal bristle brooms), blowers or kick brooms, where permitted.

With the right knowledge and construction practices, hot weather problems with interlayers can be minimized.

For additional information please visit the Asphalt Interlayer Association (AIA) website at: [www.aia-us.org](http://www.aia-us.org) or contact Ray Myers of AIA at (916)933-5125 .



## Potholes and Other Thoughts

By Mike Garcia, Sacramento County

The Chief of Staff for a Board of Supervisor's member recently asked, 'Why don't the potholes stay fixed, and what is the difference between a chuck hole and a pot hole?' So here's a little information on some of our basic terminologies and repair strategies.

But first a little about Sacramento County DOT's approach to pothole repair. Our Department repairs over 40,000 potholes on over 5000 lane miles of roadway each year. It is unfortunate that many of these repairs must be done with softer materials such as hydro-patch and cold mix (cutback) asphalt due to the time of year and the circumstances, like rain and cold when the work is performed. When it is raining or cold, hot asphalt is most likely not available and does not adhere well to the road surface. But we have found that most of the cold mix repairs hold very well and last for many years if the roadway itself is sound.

But due to the roadway conditions in some areas, pothole repairs made by patching during cold and/or wet weather might not last long. Often the road base itself is not sound because water gets in through the cracks and poor pavement. So the water in the base under the asphalt is what is causing the problem. Water does not compact. When a pothole is hit by the 8" tire of a 5,000 pound truck going 50 miles per hour, the amount of force is over 1000 foot pounds; the equivalent of a shotgun blast. The effect is that the water wants to explode upward and takes the asphalt with it.

The answer is to overlay or surface treat the roadways to prevent water intrusion. There has been little funding for these types of treatments for a long time. The gas tax was raised this year, but we will not get any of the money until well into 2018, and that will come incrementally. And it goes without saying that the

weather has not been kind to the roadway system this year.

Here's the general terminologies and 'jargon' we use to describe the various imperfections that are so pervasive in our roadway system.

- A 'pothole/chuckhole' is a singular area where the pavement is broken out that is deeper than two inches and possible reaches the base rock material. These can usually be fixed any time of year.
- A 'de-lam' (stands for delamination) looks like a shallow pot hole, where the top layer of asphalt is worn or chipped away, but is so shallow that it can only be fixed in the summer time when the asphalt will bond properly.



Delamination with alligator cracking

- 'Rutting' is where the roadway wears away or compacts, like in the wheel paths of truck lanes. Ruts must usually be ground or dug out and then patched to repair.
- 'Shoving' is where the asphalt actually distorts and pushes up, like at intersections. The humps should be ground off or removed.
- 'Alligator cracking' is where the road surface is breaking up in a large area and cracking in small blocks, that look kind of like an alligator's back. This must be dug out and "base repaired", where you dig to the base layer, replace any bad areas of that and then repave. This should be done in dry weather.
- 'Continuous pot holing' we refer to as failure. It looks like a long bunch of pot holes, sometimes on a paving seam. That is why they look like fissures and can go for long distances. Cold patching these areas can be effective, if done under the right conditions.

I hope this basic information will hit home and be of use to others facing the same pavement maintenance challenges.

For more information contact Mike Garcia at: [garciami@scacounty.net](mailto:garciami@scacounty.net)

Pothole or Chuckhole





# Wide Crack Treatment & Patching

By Carollee Dennis and Steven R. Ford, Maxwell Products

Regularly sealing cracks is an essential part of any pavement maintenance program, but what do you do when crack sealing just isn't enough? The traditional pavement preservation program leaves a gap between crack sealing and repaving, and, in terms of cost, that gap is enormous. Wide cracks and more severe pavement deterioration (potholes, rutting, etc) pose a serious threat to the integrity of pavement and to traffic safety.



Wide Longitudinal Gap Crack (Woodside)

Various specialty materials are now available to address this type of problem. Maxwell Products, Inc. of Utah introduced their GAP brand of hot-applied pavement maintenance products to address the problems too big for conventional crack filling / sealing,

with several grades for different climates. GAP is a versatile solution and has been used to correct wide cracks, raveling, cupping and depressions, fatigue cracking ('alligatoring' areas), voids and potholes, open paving seams, and more. This material is designed to bond tightly to surrounding pavement and to withstand vehicle and pedestrian traffic, snowplows, and weather.

"The [GAP] material we used in late November has performed real well," said Raymundo Elias, retired Caltrans District 4 Area Superintendent. "The results are far better than the conventional material used to seal the crack. The longitudinal, wide crack was a real problem to bicyclists and motorists traveling along Woodside Road, and it seemed to swallow anything we used to seal it. The [GAP] material's adhesion to the sides and the stretching capabilities of the material has kept the material in place."



Applying GAP Mastic, Transverse Crack (Shasta County)

Because of the polymer-modified, thermoplastic asphalt binder, GAP remains bound together and doesn't come apart or ravel out, leaving an unsightly mess of material. It employs specialized, high-strength, engineered aggregates, creating a durable, reinforced material. The applied GAP product is structural, load-bearing, and resists pushing, shoving, and slippage. GAP binders have been shown in laboratory tests to typically stretch 500%-700% before losing adhesion, which simultaneously accommodates thermal movement and creates a moisture seal. "The [GAP] material used on Lee Road 159 is per-



After GAP Mastic Repair, Longitudinal Crack (Woodside)

forming extremely well," said Buzz Powell, P.E., Assistant Director and Test Track Manager at the National Center for Asphalt Technologies in Alabama. "The area has been slipping for some time; however, where [GAP] was applied, the material is holding the asphalt overlay together and has stopped the slippage. The surrounding area continues to slip. Also on Lee Road 159, [GAP] was applied to an area of fatigue cracking and potholes. The pavement was removed and replaced with [GAP]. It is also continuing to perform exactly as promised. There is no evidence of cracking or weakness in the material."

Additionally, GAP material has been successfully applied to pavement distress in Lassen County, Shasta County, Marin County, Caltrans Districts 2, 3, 4, 9, and 12, the cities of Richmond, Sacramento, Barstow, Escondido, Palm Springs, San Ysidro, Lake Elsinore, Redlands, Snowline Unified School District (Phelan), Camp Pendleton (USMC, Oceanside), and several municipal airports.

For more info go to: [maxwellproducts.com](http://maxwellproducts.com) or contact: [carol.d@maxwellproducts.com](mailto:carol.d@maxwellproducts.com) (Northern California) or (Southern California) [mark.avery@maxwellproducts.com](mailto:mark.avery@maxwellproducts.com)





## Dowel Bar Retrofit on Thin PCC Overlays

By Kristin Dispenza, for IGGA\*

In 2016, the Olmsted County (Minnesota) Transportation Division initiated a concrete pavement preservation (CPP) project on County Highway 22. The highway's original pavement section, constructed in the mid-1980s, had been full depth bituminous (asphalt) – a total of 14.5 inches on grade. Being heavily traveled, the road had experienced rutting as deep as two inches, and by 2011 Olmsted County elected to rehabilitate it by removing 6.5 inches of the asphalt section and replacing it with 6.5 inches of portland cement concrete (PCC) pavement.

With 8 inches of the asphalt section remaining to provide support, no dowel bars were placed in the concrete overlay in 2011. However, some of the concrete pavement did experience faulting and motorists began to express their concerns over the poor ride quality. So a better strategy was needed. This came in the form of a 6.5 inch PCC overlay with dowel bar retrofit (DBR).

"Dowel bar retrofit was the solution, but with a thinner-than-usual slab depth of 6.5 inches, we chose 1-inch diameter dowel bars rather than the usual 1.5 inch ones," said Scott Holmes, Transportation Supervisor of Construction & Traffic with Olmsted County Public Works.

"We had MnROAD -a pavement test track owned and operated by the Minnesota Department of Transportation- investigate the configuration, then chose to place three bars on the inside wheel path as well as the outside one for additional support, because the concrete slabs did not contain tie bars," continued Holmes.



**Dowel Bar Assemblies Ready to be Placed into Cut Slots**

Dowel bar retrofit (DBR) is a load transfer restoration process that delivers a renewed level of structural strength to PCC pavement. The DBR process involves placement of load transfer devices across transverse joints and/or cracks in existing concrete pavements that exhibit poor load transfer, heavy faulting, pumping and/or corner breaks. The load transfer mechanisms generally consist of two, three or four round dowel bars placed parallel to the centerline in the wheel paths of the roadway.

Retrofit techniques based on the use of steel, epoxy-coated dowel bars were introduced in Georgia in the late 1980s and were optimized for production operations in Washington State in the early 1990s. Since that time, over 7 million dowel bar retrofits have been completed on numerous successful projects across the United States. DBR technology has continued to evolve, with experimental designs and materials being developed and tested at various agencies and institutions.

The use of 1-inch dowels has been proven effective as evidenced by numerous states' ex-



**Dowel Bar Pattern in Wheelpaths**

periences over the course of many years. They are well suited for thinner concrete pavement sections (i.e., those with a final thickness less than 8 inches), and their smaller size allows for the necessary concrete cover to accomplish effective load transfer at the pavement joint. This procedure is particularly applicable in municipal and county roadway networks, where undoweled thin section concrete pavements have been used for years and are now in need of additional load transfer.

By September 2016 the Olmsted County DBR project was complete, with final pavement grinding, joint sealing and pavement marking. The total project cost was for this 6.5 inch overlay was \$1.2 million, with the DBR portion costing \$860,000 (including slot-cutting, installation, patching and saw and seal). A total of 26,882 dowels were used and 72,558 square yards of grinding took place.

The work performed is part of the county's concrete rehabilitation program, which aims to optimize the life cycle of its concrete road network. It is expected that this vital roadway will last for 30 years, requiring minimal maintenance and ensuring a safe, smooth and sustainable facility for the driving public.

\*For more information visit the International Grinding and Grooving (IGGA) website at: [www.igga.net](http://www.igga.net)



## P2 Certification Program Gaining Speed

By Roger Smith, CP2 Center

The Western Region Association For Pavement Preservation (WRAPP) recently partnered with the University of Nevada Reno (UNR), the Nevada Department of Transportation (NDOT), and the National Center for Pavement Preservation (NCP) in Michigan to bring pavement preservation (P2) training and certification to Reno, NV. The training was held at UNR on Tuesday, March 28th, and was provided free of charge to agency attendees on a first-come, first-served basis. It was attended by over 60 people from contractor and public agencies in California and Nevada. Topics included P2 concepts, evolving specifications, and construction techniques. This training was designed to prepare people for the certification exam the following day.

On a national level, contractor and agency certifications are gaining momentum at both the state DOT and local level. In 2016, the Nevada DOT (NDOT) began the process of requiring contractors to be AASHTO TSP2-certified in order to perform work on NDOT chip seals and micro surfacing projects. This requirement is now also being specified for agency people and for consultant personnel facilitating the projects. The "joint" certification requirement - for both agency and contractor personnel - is a step towards producing consistently high quality P2 treatments. The program currently provides certifications for fog seals, chip seals, slurry systems, and crack treatments. In Reno, 25 people took the certification exams, 9 from California.



Neal Galehouse from the NCPP was on site to administer the AASHTO TSP2 certification exam on March 29th.

Larry Galehouse of the NCPP commented, "We continually strive to develop the best designs, use the best materials, and construct pavement preservation treatments with good workmanship. Certification is an important step to insure practitioners understand the complete treatment process.

Each specific treatment requires knowledge in project selection, materials, design, equipment, construction, and quality assurance. We're pleased to see the interest for pavement preservation certification in California and Nevada."

NCPP and WRAPP strongly recommend that those individuals taking the certification exam complete at least the free web-based training prior to taking the exam. Past experience has shown that exam pass rates have substantially improved with the successful completion of the web-based training. To take the free web-based training, please follow the registration instructions located at <http://slurry.org/wbt/issa-wbt-login-instructions/>.

Please note that the AASHTO TSP-2 certification exam requires a separate registration from the web-based training. To register for the exam online, please visit: <https://www.pavementpreservation.org/certification/upcoming-exams/>

The cost of each exam is \$200 for agency employees and \$325 for contractor and consultant employees.

For more information go to the NCPP website at: [www.pavementpreservation.org/](http://www.pavementpreservation.org/)



## It's Time for Accountability and Performance Tracking

By Sui Tan, Metropolitan Transportation Commission (MTC)

Cities and counties should give themselves a pat on the back with the passage of Senate Bill 1 (SB1) in April. This bill will raise gas taxes and vehicle fees by \$5.2 billion a year to pay for California's crumbling roads, highways, and bridges for the next decade. Cities and counties will receive \$1.5 billion annually to fix local streets and roads. Since 2008, cities and counties, through the "California Statewide Local Streets and Roads Needs Assessment" initiative ([www.SaveCaliforniaStreets.org](http://www.SaveCaliforniaStreets.org)), have been

documenting their maintenance needs for local streets and roads. The \$78 billion shortfall over the next decade, as cited in SB1, was a result of the needs assessment study. Unfortunately, SB1 only covers 20% of the shortfall.

### Performance, Accountability, and Transparency

At the state level SB1 holds Caltrans accountable for the efficient use of funding by requiring them to adopt a

*Continued, next page*



transportation asset management plan. But no such requirement is needed for cities and counties. However, this is not to say that asset management isn't important for cities and counties, nor that cities and counties can freely use the funding as they see fit. On the contrary...they are still accountable for the efficient use of funding in the form of their performance and transparency to the motoring public. So if your agency doesn't have a pavement management program as part of your transportation asset management, you should be making it a priority now.

### Performance Measures

For the majority of the cities and counties that deploy a pavement management system, there are a few performance measures, or 'key performance indicators' (KPI), that can help track the effectiveness of pavement preservation efforts from the use of SB1 funds. I'll talk more about KPI's in a future issue, but for now, let's focus on the effectiveness of pavement preservation efforts.

You need look no further than your pavement management system, which tracks maintenance and rehabilitation history. You may start with finding out what is the recommended percentage for preventive maintenance when your network is in the 'state of good repair' (SGR PM%). This will be the ultimate goal of pavement managers - to be able to sustain their pavement asset perpetually. Then you will calculate the pavement maintenance work that your agency has completed in the last 3 years. To get credit for preventive maintenance, based

on best management practice, you will have to apply a treatment to arterial and collector streets with pavement condition index (PCI) above 70, and residential streets and local roads with PCI's above 60. Once those road segments have been identified, you will sum them up for the year and compare their cost to the entire maintenance expenditure. This is your preventive maintenance percentage (PM%).

You will need to develop at least 3 years of history, averaging them to arrive at a reasonable actual PM%. When you compare this value to the SGR PM%, you get the effectiveness of your pavement maintenance and preservation effort, which is called the Pavement Preservation Index (PPI).

In the MTC region, using our StreetSaver® pavement management system, we are able to track the effectiveness of pavement preservation programs through the use of PPI values. As shown in the figure below, the benchmark PPI for the region in 2012 was 1.06. This means that overall, the Bay Area's cities and counties are generally subscribing to pavement preservation. For example, within Alameda County, it shows there are agencies who are strong advocates for pavement preservation and others who are not. We are developing other indicators, i.e., KPI's, that will be available at the end of the year when StreetSaver® switches to a full, web-based version. Stay tuned!

For more information, visit: <http://mtc.ca.gov/tools-resources/online-tools> or contact Sui Tan at: [mtan@mtc.ca.gov](mailto:mtan@mtc.ca.gov)

$$\text{KPI: Pavement Preservation Index (PPI)} = \frac{\text{Actual PM \%}}{\text{SGR PM\%}}$$

County	Jurisdiction	Network PCI	\$PM/% Actual Lane Mile	% PM	% Needs	Pavement Preservation Index
	<b>Regional Benchmarks</b>	<b>66</b>	<b>\$ 1,336</b>	<b>17%</b>	<b>16%</b>	<b>1.06</b>
Alameda	ALAMEDA	66	\$ 1,271	13%	15%	0.88
	ALAMEDA CO.	71	\$ 671	18%	28%	0.67
	ALBANY	58	\$ 1,247	10%	13%	0.78
	BERKELEY	58	\$ 263	2%	11%	0.20
	DUBLIN	87	\$ 3,124	50%	79%	0.62
	EMERYVILLE	75	\$ 48	100%	35%	2.87
	FREMONT	63	\$ 5,140	43%	16%	2.76

## FHWA Update

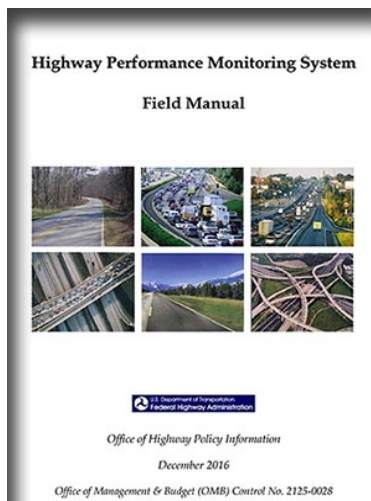
By Steve Healow, FHWA, Sacramento

The national Highway Trust Fund (HTF) is solvent and will remain so through the end of September thanks to an omnibus spending bill passed by Congress and signed by the President.

In a separate action in the U.S. House of Representatives a proposed bill would raise the federal gas tax and index the tax to inflation. If Congress doesn't act, it's likely the HTF will need another cash infusion no later than 2020.

State DOT's have been waiting for the 'final rule' on pavement and bridge condition "performance measures" on the National Highway System (NHS) - pursuant to the provisions in MAP-21 and the FAST Act. The wait is over. The final rule took effect as of May 20. It establishes measures for State DOTs and MPOs to use in assessing the condition of pavements on their Interstate and Non-Interstate NHS routes. The four measures to assess pavement condition are:

1. Percentage of pavements on the Interstate System in *Good* condition.
2. Percentage of pavements on the Interstate System in *Poor* condition.
3. Percentage of pavements on the NHS (excluding the Interstate System) in *Good* condition.
4. Percentage of pavements on the NHS (excluding the Interstate System) in *Poor* condition.



The standard methods for acquiring pavement condition data are consistent with the Highway Performance Management System (HPMS) Field Manual viewable at: <https://www.fhwa.dot.gov/policyinformation/hpms/fieldmanual/>.

State DOTs have been reporting condition and perfor-

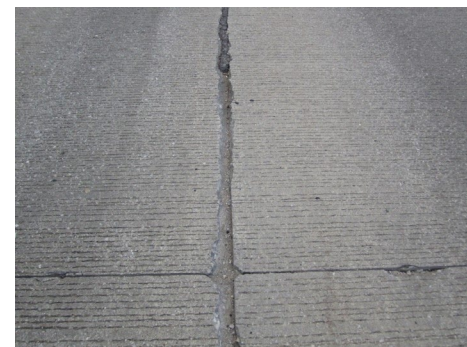
mance data to the HPMS database annually for over four decades. In partnership with the AASHTO subcommittee on Asset Management, FHWA has scheduled a series of webinars to clarify the new regulation. You can see slides and recorded webinars and a schedule for future webinars at: <http://www.tam-portal.com/event/>.



If you're a pavement manager looking for how to improve the durability (service life) of your asphalt pavements, you may be interested in a report titled "*Enhanced Compaction to Improve Durability and Extend Pavement Service Life*", by Tran, Turner and Shambley of the National Center for Asphalt Technology (NCAT) at Auburn University. This literature search helps explain the effect of higher in-place density on pavement fatigue, rutting, service life and life-cycle costs. See also: <http://asphaltmagazine.com/durability/>.



Among the most recent publications by the National Concrete Pavement Technology Center at Iowa State University is "*Guide to the Prevention and Restoration of Early Joint Deterioration in Concrete Pavements*". This study analyzes the principle causes of premature joint distress and concludes with remedial measures to reduce the risk of pavement distress. See also: <http://www.cptech-center.org/technical-library/publications/>.



For more information on any of these items contact Steve Healow with FHWA's California Division at: [Steve.Healow@dot.gov](mailto:Steve.Healow@dot.gov)

## Emulsion Task Force Update

By R. Gary Hicks, CP<sup>2</sup> Center

The AASHTO TSP-2 Emulsion Task Force (ETF) met in Denver on May 23-24, 2017, to review progress on the development of national specifications for emulsions and pavement preservation treatments. The group is chaired by Colin Franco (Rhode Island DOT) and Chris Lubbers (Kraton Polymers LLC.). Over 30 members participated in this meeting.



### Slurry Seal Lab Testing

The primary goal of the ETF is to improve the specifications for preservation treatments that utilize emulsions, including the development of materials specifications, design practices, and construction guides in the AASHTO format. Since 2013, the group has accomplished the following;

- Published AASHTO standards and practices for emulsions (M140-16, M208-16, and M316-16), chip seals and microsurfacing
- Developed draft standards and practices for cold in-place recycling (CIR), slurry Seal, fog seal, and tack coats, which were voted on in November 2016
- Developed new specifications for scrub seals and sand seals, and will be developing new standards for thin bonded wearing courses, to be voted on in 2017.

- Recommended and submitted research problem statements to AASHTO /TRB (for the NCHRP program) to develop improved guides for the construction of chip seals and microsurfacing. The submissions were accepted resulting in NCHRP projects 14-37 and 9-62 dealing with QA and specifications for CIR using asphalt-based recycling agents
- Submitted a research project statement to AASHTO/TRB to develop and validate a performance related (PG) specification for emulsified asphalts. Prior projects done for Texas DOT and for NCHRP 9-50 form the basis for this new PG grading performance specification.
- Developed QA guides and training for chip seals, that includes a certification program for Contractor and Agency personnel responsible for preservation treatments

The next meeting of the group will likely be held in the fall of 2017 to continue the efforts on all fronts.

For more information on this group, please contact either Colin Franco at [colin.franco@dot.ri.gov](mailto:colin.franco@dot.ri.gov) or Chris Lubbers at [Chris.Lubbers@kraton.com](mailto:Chris.Lubbers@kraton.com).

All of the activities from this group will be posted on the NCPP website in the near future:

<https://www.pavement-preservation.org/>



## Pavement Maintenance Magazine

By Roger Smith, CP<sup>2</sup> Center

Technology transfer and information exchange are valuable in any industry. We probably all get at least one magazine on asphalt pavement, but most of them are focused on hot mix and paving, and don't address the specialized world of pavement maintenance. One national magazine fills this void... "Pavement Maintenance & Reconstruction". It's filled with articles and information relating to pavement maintenance, and also related technologies like striping and sweeping.

Subscriptions are free to maintenance contrac-

tors, producers and dealers of maintenance equipment and materials and government employees.

Go to: <http://www.forconstructionpros.com/subscribe/print/pvm> to register. Pavement Maintenance & Reconstruction is also the official magazine of National Pavement Expo, which the magazine started and ran for more than 30 years before selling it to Emerald Expositions in 2016. NPE offers extensive training sessions and a big equipment show. Find more information on the 2018 National Pavement Expo, which will be held Feb. 7-10 in Cleveland, OH, at: [nationalpavementexpo.com](http://nationalpavementexpo.com)







## Mark Your Calendar (Coming Events)

### **"Asphalt Pavement 101" Classes**

**June 21(San Jose), June 22(Santa Rosa),  
Oct 25(Redding), Oct 26 (Sacramento)**

Four sessions of CalAPA's popular "Asphalt Pavement 101" class will be offered in northern California. This 4-hour class provides an overview of asphalt pavement design, materials, equipment, construction, and inspection basics. It's great introductory training for new hires and provides a solid refresher and update for more experienced personnel. For more information go to: [www.calapa.net](http://www.calapa.net)

### **The Tech Transfer Center at U.C. Berkeley offers the following pavement classes:**

IDM-03 [Asphalt Pavement Materials, Design, Construction and Maintenance](#)

IDM-04 [Asphalt Pavement Maintenance for Local Agencies](#)

IDM-26 [In-Place Asphalt Recycling & Soil Stabilization Strategies](#)

IDM-27 [Superpave Mix Design for Local Agencies \(online\)](#)

IDM-28 [Pavement Management Systems and Preservation Strategies](#)

Learn more at:

<https://registration.techtransfer.berkeley.edu/wconnect/ShowSchedule.awp?&Mode=GROUP&Group=PAVE&Title=Pavement+Design+and+Maintenance>

### **MSA Conference & Equipment Show September 11-15 (Santa Maria)**

The Maintenance Superintendents Association (MSA) 49th Annual Conference and Equipment Show will be hosted by the Central Coast Chapter in Santa Maria. Lots of good educational programs and vendor exhibits are planned.

For more information go to: [www.mainsupt.com](http://www.mainsupt.com)

### **RPUG Conference**

**November 14-16 (Denver)**

The Roadway Profile Users Group (RPUG) 2017 Conference will be held November 14-16 in Denver. The 2016 Conference in San Diego attracted over 120 technologists from across the US and as far away as Australia, Sweden and Asia. (There is a separate RPUG for Europe.) Over 20 State DOTs were represented, as well as FHWA, consultants and equipment vendors. This event will offer the latest thinking on pavement smoothness measurement and specifications. For more information go to: [www.rpug.org](http://www.rpug.org)

### **CalAPA Fall Asphalt Conference & Equipment Show.... October 25-26 (Sacramento)**

Hear from top policy-makers and respected experts from across the country on topics that will directly impact your business or your agency now and in the future

Topics will include: best practices in Hot Mix Asphalt design; specifications; testing; paving; future trends; research projects. Updates on legislation and funding for road construction and maintenance will also be included. In conjunction with the Conference, the popular class, "Asphalt Pavement 101", will also be offered.

For more information go to: [www.calapa.net](http://www.calapa.net)

### **APWA Public Works Conference**

**November 8-9 (Richmond)**

The northern California Chapter of the American Public Works Association (APWA) will hold its 21st Annual Public Works Conference on November 8-9 at the Memorial Auditorium in Richmond. This event includes educational forums and vendor exhibits. For more information go to: <http://northernca.apwa.net/EventDetails/11780>



**Disclaimer: Caltrans does not endorse any industry products or services, and the contents of newsletter articles reflect the views of the authors and do not necessarily reflect the official views or policies of Caltrans, the CP<sup>2</sup> Center, or the State of California.**

Caltrans established the California Pavement Preservation (CP<sup>2</sup> Center) at CSU, Chico in July 2006, and fully funded the Center in January 2007. Dr. DingXin Cheng is the current Director of the Center. Mr. Hector Romero is the current contract manager of Caltrans.

The purpose of the Center is to provide pavement preservation support services to Caltrans and other public agencies, and to industry. Unique services include developing educational programs in pavement preservation, providing training and staff development opportunities, providing needed technical assistance to public agencies and industry, and managing/conducting research and outreach services, such as this newsletter.

CP<sup>2</sup> Center News is published quarterly by the CP<sup>2</sup> Center, Langdon Hall Suite 203, California State University, Chico, Chico, CA 95929-0603, Subscriptions by e-mail: contact [CP2C@csuchico.edu](mailto:CP2C@csuchico.edu) to add your name to the distribution list.